

How to incorporate vulnerability assessments in statewide drought planning

an example from Colorado

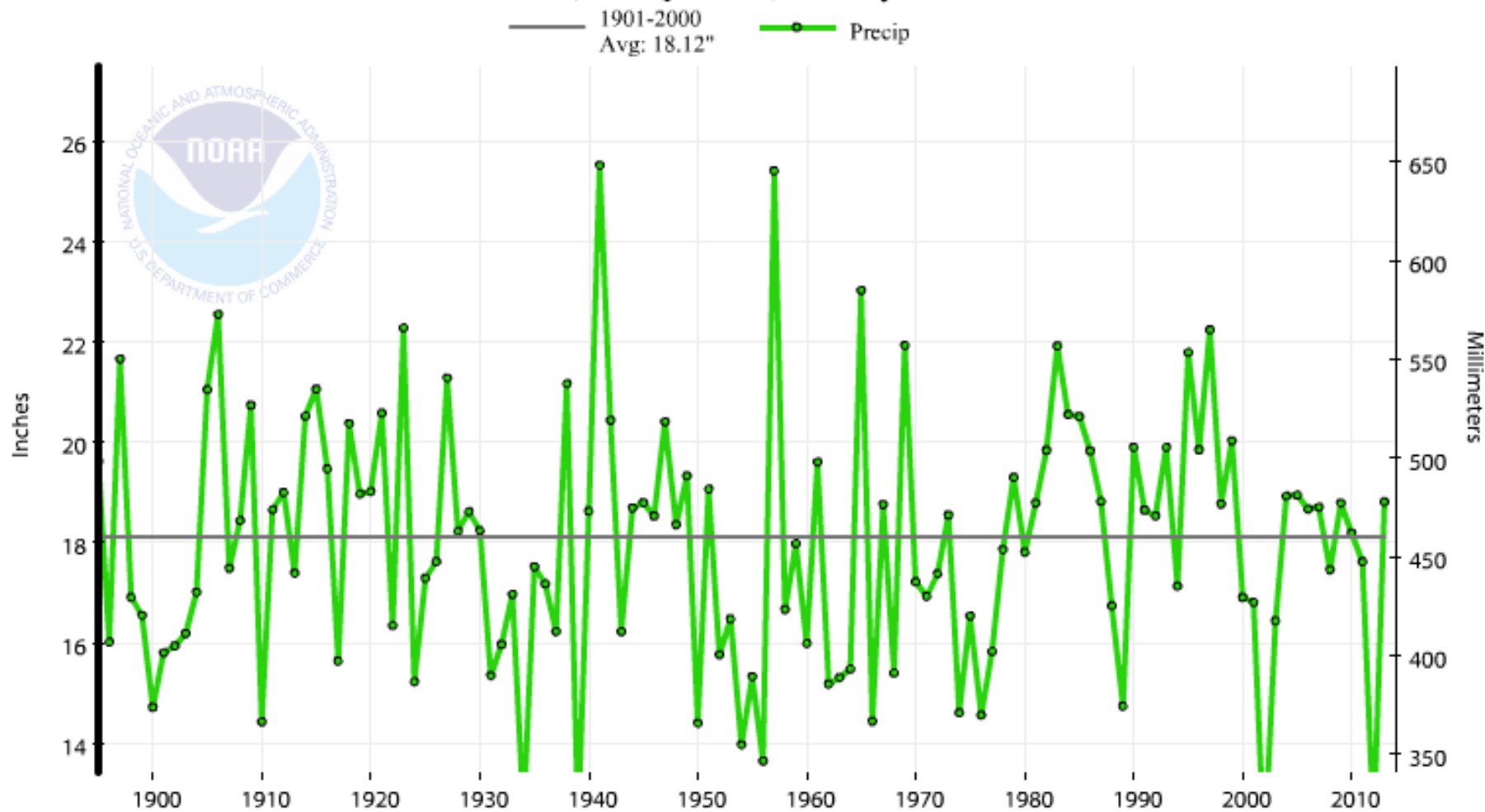
Taryn Finnessey
Climate Change Risk Management Specialist
Colorado Water Conservation Board

***With contributions from Jeff Brislawn, AMEC Foster Wheeler
& Ben Harding, Lynker Technologies***

**Western States Drought Coordinators &
Emergency Managers Meeting**
Seattle, WA
July 21-22, 2015



Colorado, Precipitation, January-December



COLORADO
Department of Natural Resources

- **Vulnerability** +



Methodological Framework

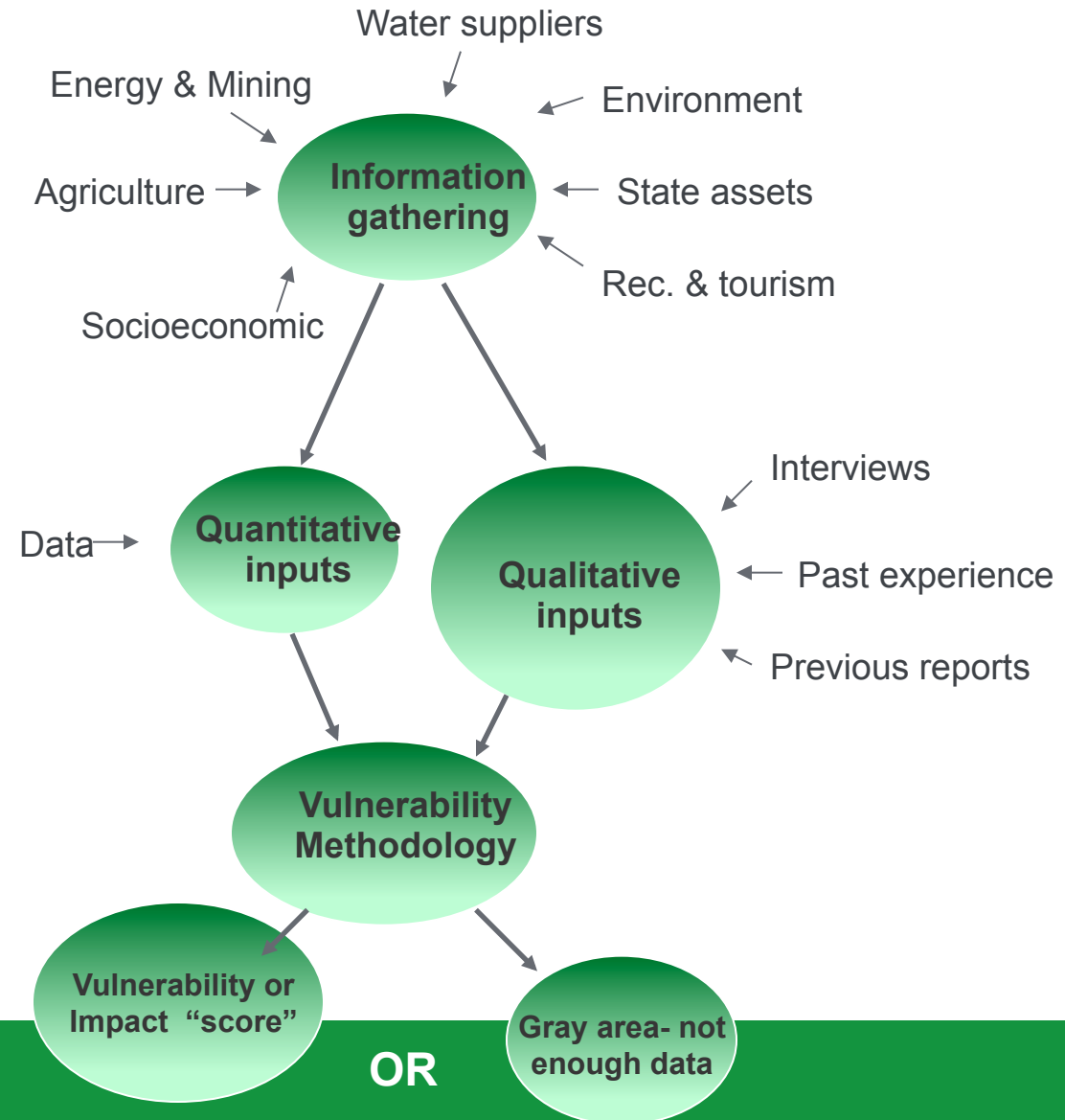
Research sectors, publications,
previous drought studies

Quantitative data
What we have
What we need

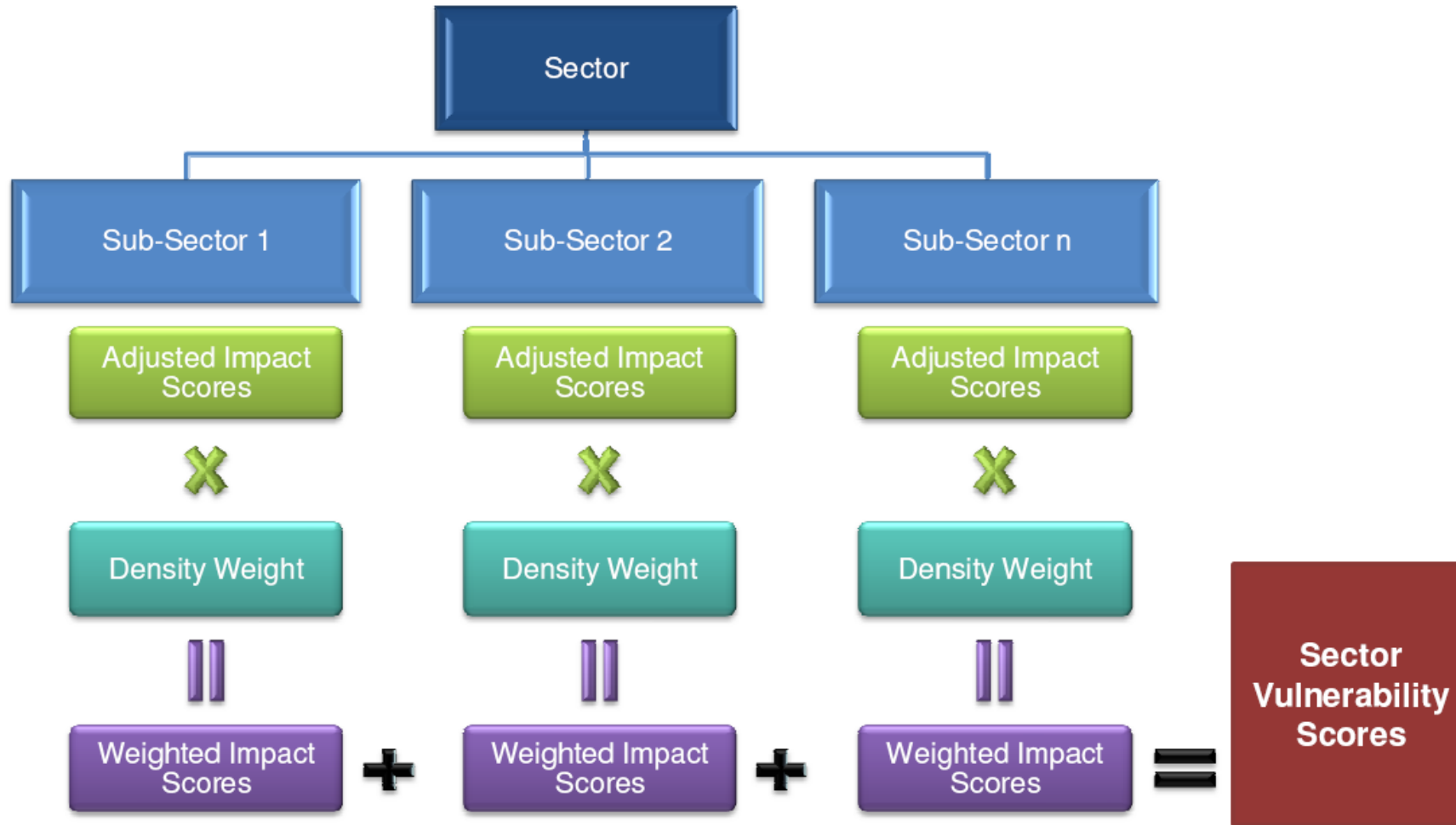
Qualitative
Interviews
Past experiences
Specific knowledge of the area

Methodology

Vulnerability “score” OR
framework for future data
collection



Sector Vulnerability Calculations



Agriculture: Key Findings

Subsectors

Crops

Livestock

Green Industry.

- Key drought vulnerabilities include: crop loss from lack of precipitation or insufficient irrigation, and/or damage to crops due to reduced quality of irrigation water.
- Grazing lands are vulnerable to drought, resulting in limited forage availability and disturbance of the managed ecosystem.
- 2012 drought- Crop “loss” of \$409 million USD & \$630 million of unrealized economic activity

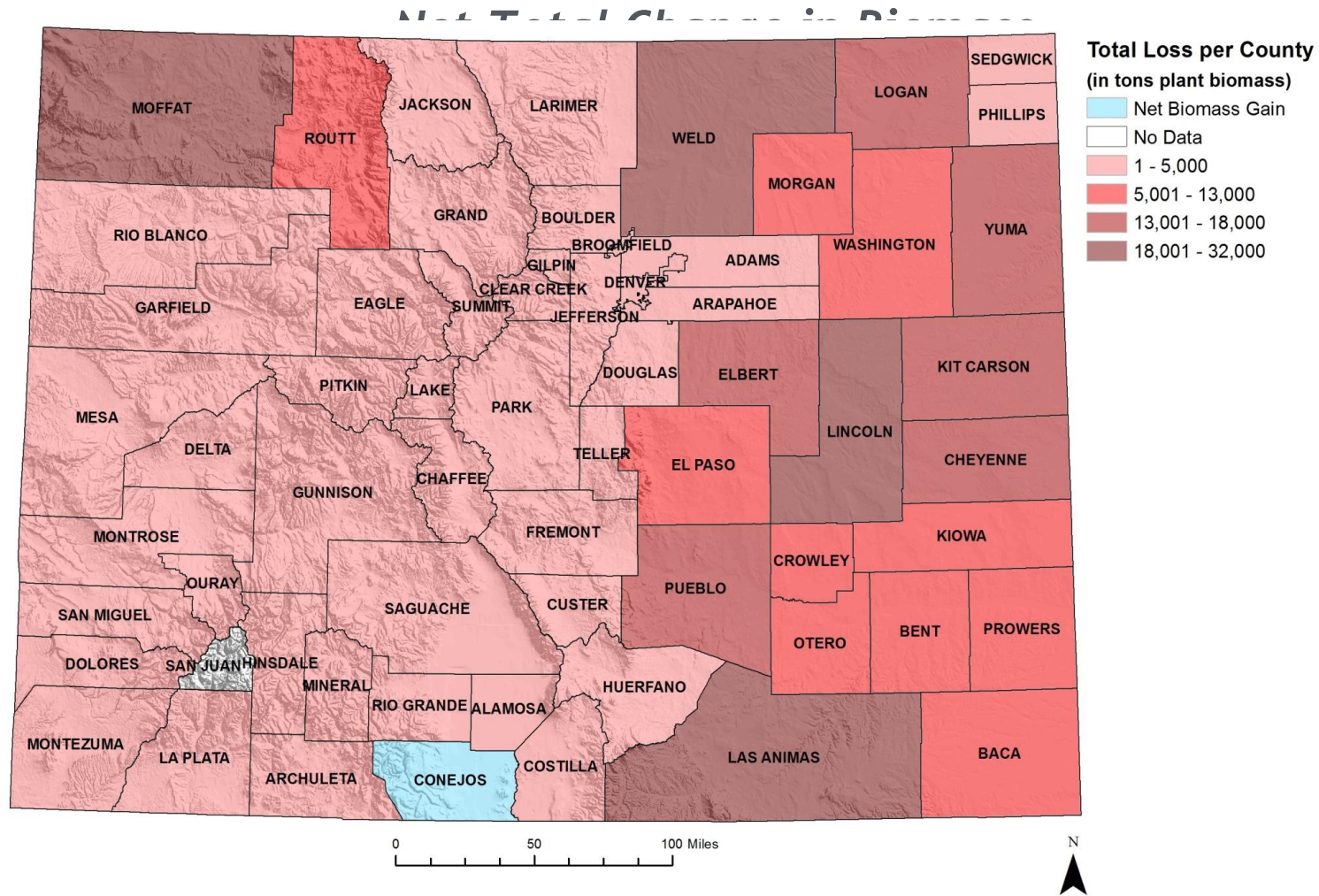


Ag: Key Recommendations

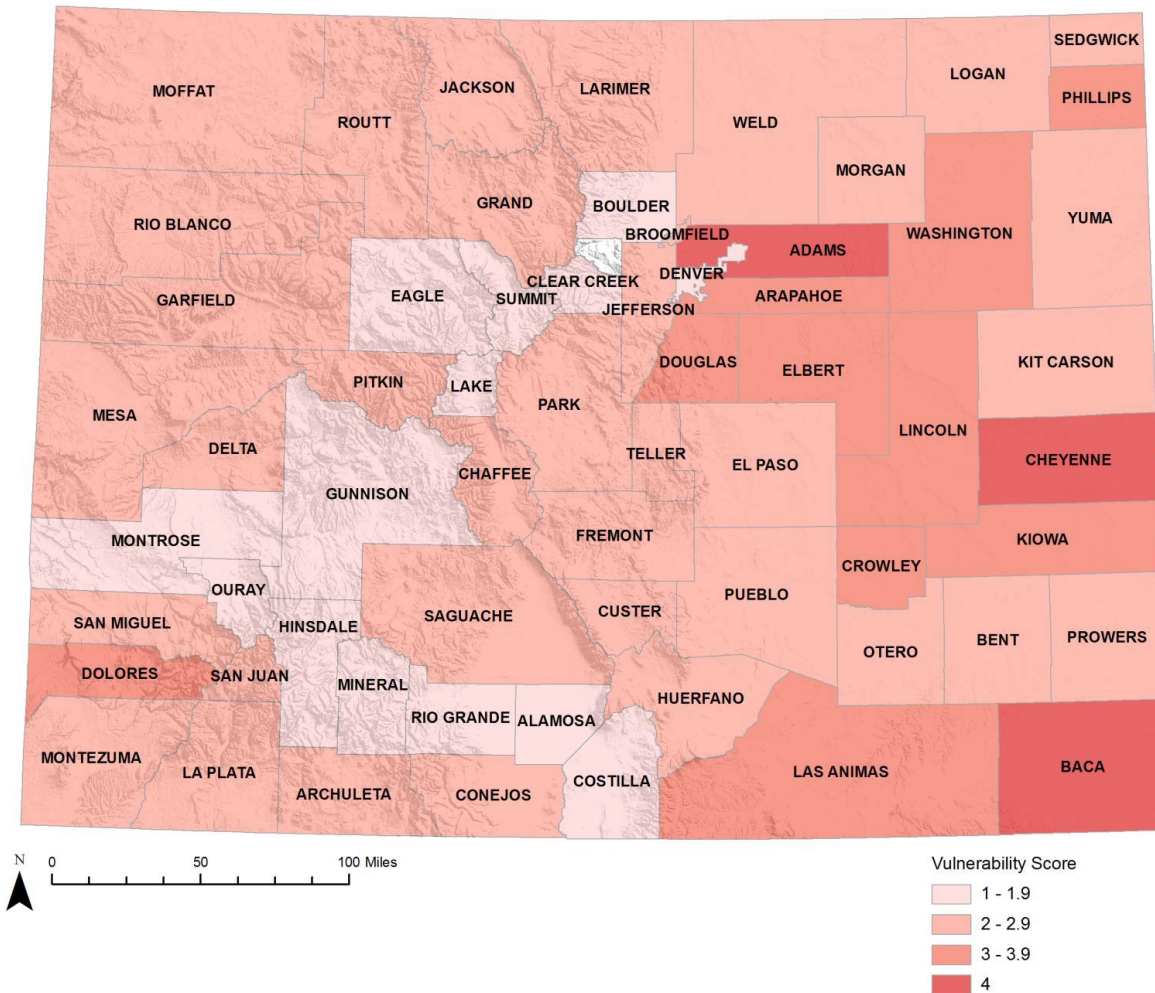
- Crop diversification and advanced planning for drought scenarios can benefit all sub-sectors within the Agriculture Sector.
- Dryland crops were identified as the most vulnerable, a specific analysis of irrigated crops and water availability is recommended.
- Best management practices developed by the green industry might have applications for irrigated crop producers.
- Due to the small sample size of green industry producers, public data on this sub-sector is not available. A survey instrument might be a valuable tool to collect information about the industry in the future.
- NASA's CASA (Carnegie-Ames-Stanford Approach) model provides a way for resource managers to measure drought impacts in Colorado at a synoptic scale.



CASA Results



Overall Agriculture Vulnerability Scores



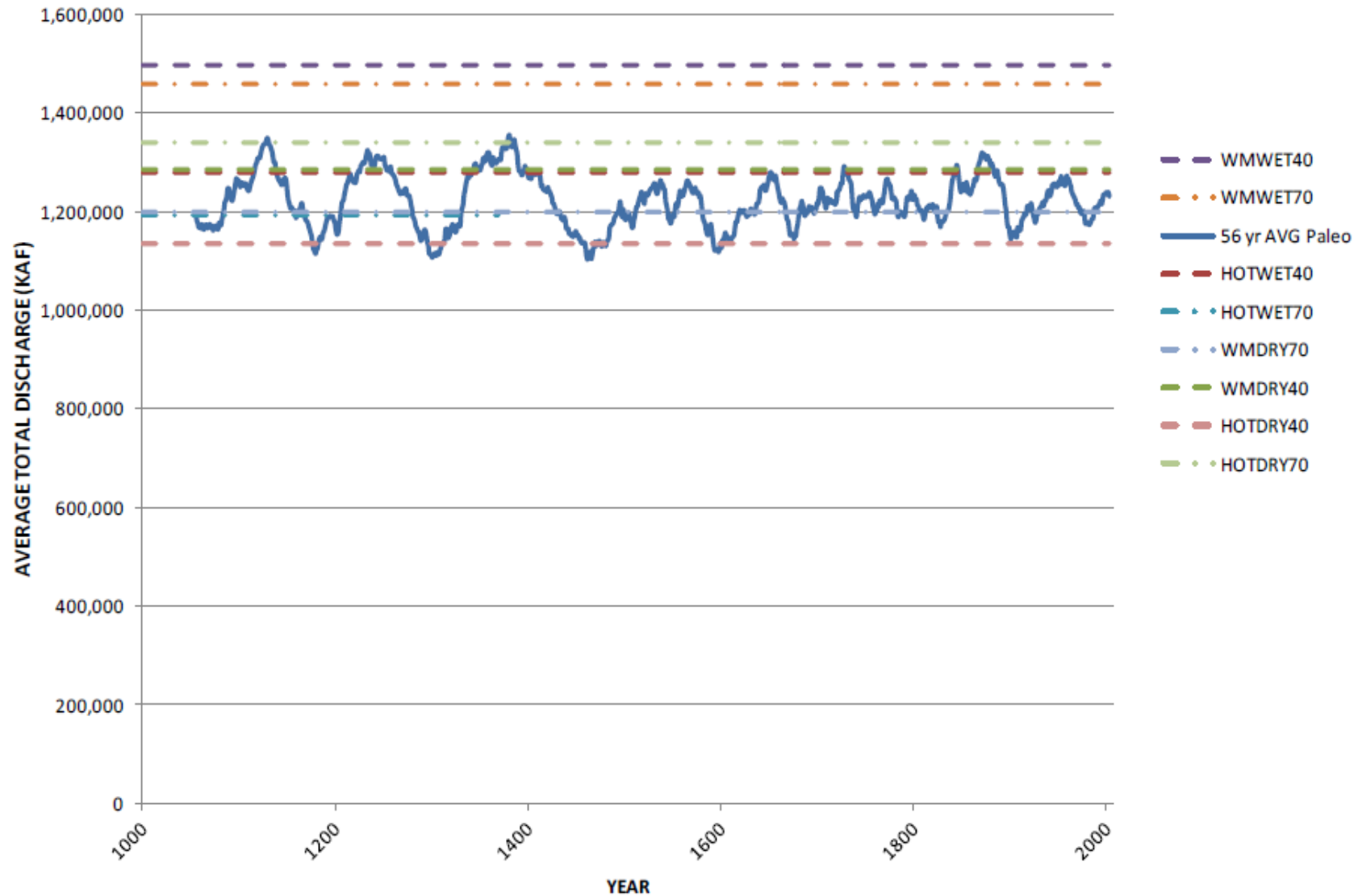
Climate Change Analysis

09095500 Colorado River near Cameo

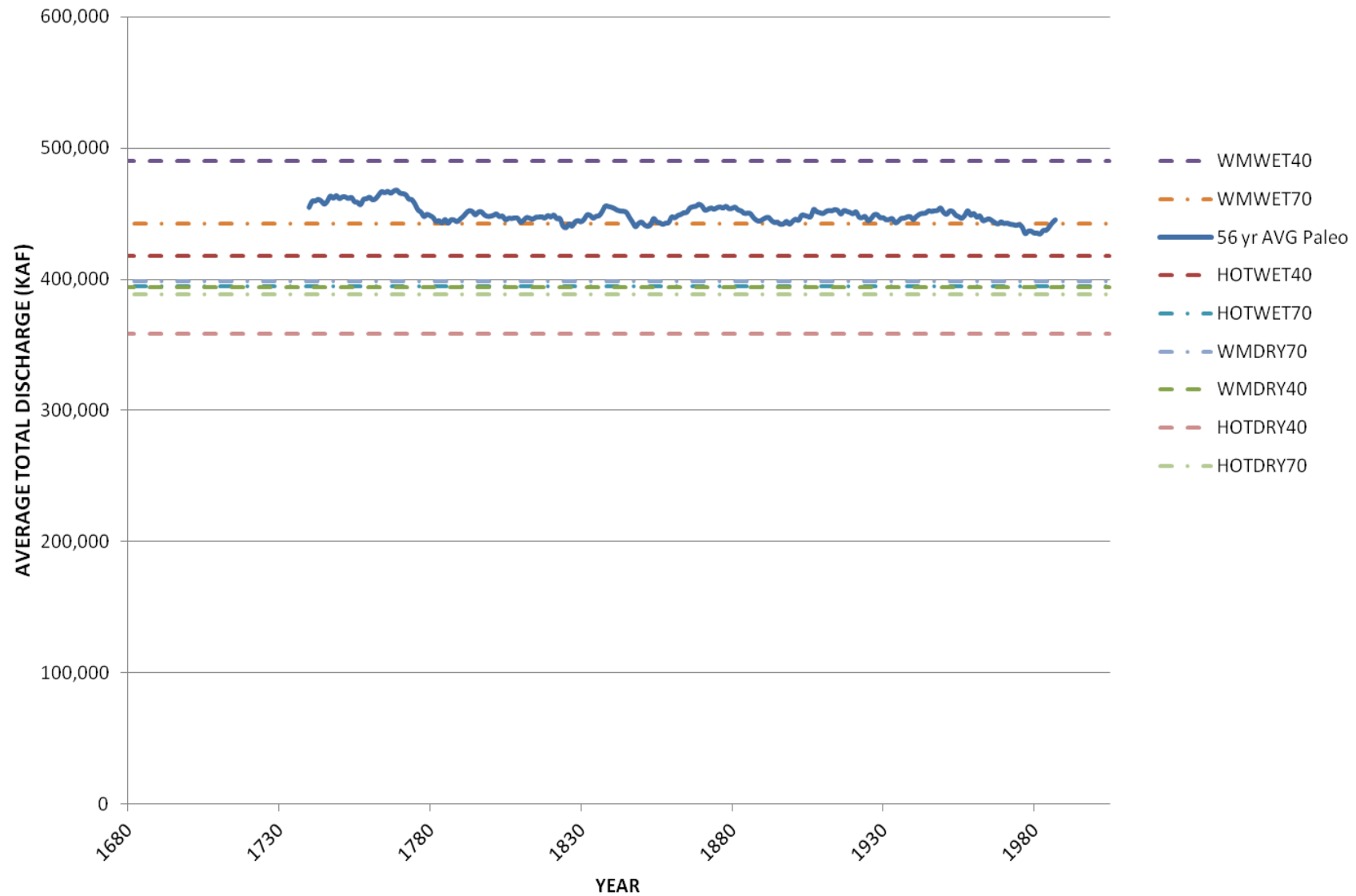
	Observed Spells			
	Length of Spell (years)		Intensity of Spell (% of mean)	
	Drought	Surplus	Drought	Surplus
	6	5	-19%	46%

Alternative Hydrology Spells				
Case	Return Interval of historic spell length (years)		Average Annual Deficit/Surplus (% of mean)	
	Drought	Surplus	Drought	Surplus
Alternative Historical	31	19	-24%	27%
2040 Climate A	6	933	-30%	23%
2040 Climate B	27	47	-29%	19%
2040 Climate C	22	49	-28%	18%
2040 Climate D	53	20	-25%	29%
2040 Climate E	800	6	-19%	36%
2070 Climate F	6	5600	-31%	24%
2070 Climate G	12	267	-31%	18%
2070 Climate H	27	66	-32%	17%
2070 Climate I	30	22	-23%	27%
2070 Climate J	127	13	-19%	38%

Yampa R at Maybell 56-Year Average Flow - Alternate Paleo Reconstructions and Average CRWAS Projections



Arkansas River at Salida 56-Year Average Flow - Paleo Reconstructions and Average Sacramento Projections



Going Forward...

- Integration in Colorado's Water Plan
- Incorporated into Colorado's Climate Plan
- Updated in 2018 with improved science and analysis
- Add additional tools and resources





Thank you

Taryn Finnessey

Taryn.Finnessey@state.co.us

Climate Change Risk Management
Specialist

